

Description

Knauf Insulation Atmosphere™ Air Duct Board with ECOSE® Technology is a rigid glass mineral wool board faced on one side with a foil-scrim-kraft (FSK) vapor retarder and with a lightweight black glass mineral wool mat on the airstream surface. It is used to fabricate rectangular, Max¹⁰ or Max²⁰ air duct systems. It comes with two stiffness ratings, EI-475 and EI-800. Both types are available with butt edge or factory molded male-female shiplap edges. The airstream surface of Knauf Insulation Atmosphere™ Air Duct Board is treated with an EPA registered, anti-microbial agent that prevents growth of mold, fungus or bacteria in accordance with ASTM C1071, G21.

ECOSE® Technology

ECOSE® Technology is a revolutionary binder based on rapidly renewable bio-based materials rather than non-renewable petroleum-based chemicals such as phenol, formaldehyde or acrylics. ECOSE® Technology reduces Knauf Insulation's binder embodied energy and contains no phenol, formaldehyde, acrylics or artificial colors found in traditional glass mineral wool insulation.

Application

Knauf Insulation Atmosphere™ Air Duct Board with ECOSE® Technology is designed for commercial and residential air handling installations for cooling, heating or dual-temperature service where good temperature control and noise absorption are required.

Features

- Low thermal conductivity of 0.23 at 75°F (24°C) mean temperature
- Low installed cost insulated duct system
- Excellent acoustical characteristics
- Dark black glass mat airstream surface
- Assured insulation thickness, shiplap joints and FSK vapor retarder
- If necessary, can be cleaned in accordance with NAIMA's "Cleaning Fibrous Glass Insulated Air Duct Systems Recommended Practices"
- Meet the fire and smoke safety regulations of most federal, state and local building codes.
- Fabrication in shop or on jobsite
- Certified for indoor air quality as a low emitting product by UL GREENGUARD to both the UL GREENGUARD Certification and the more stringent UL GREENGUARD Gold Certification.

Sustainability

- Carbon negative meaning: Knauf Insulation's products used for thermal insulating purposes recover the energy that it took to make them in just hours or a few days, depending on the application. Once installed, the product continues to save energy and reduce carbon generation as long as it is in place.
 - Glass mineral wool insulation with ECOSE® Technology contains three primary ingredients:
 - Sand, one of the world's most abundant and renewable resources
 - A minimum of 50% recycled post-consumer glass content and UL Environment verification every 6 months
 - ECOSE® Technology which reduces binder embodied energy by up to 70%
 - It is anticipated to reduce its Global Warming Potential (GWP) by approximately 4%, a significant reduction in our carbon footprint

Benefits

- Fabrication in shop environment lowers field installation time
- One craft required to fabricate and install system
- Minimum capital investment for fabrication equipment
- Portability allowing for assembly or fabrication at job site
- Black mat facing ensuring a smoother airstream surface for a cleaner cut and added durability

- Lower installation cost than with duct wrap and duct liner with sheet metal
- Black internal duct appearance
- Quiet, efficient air delivery
- Reduces noise generated by air turbulence and mechanical equipment
- Eliminates "booming" and "cracking" sounds caused by sheet metal duct contraction and expansion
- Condensation control
- Strong thermal performance
- Code compliance

Specification Compliance

In U.S.:

- ASTM C 1136; Type II (FSK facing)
- ASTM G 21
- Corps of Engineers Guide Specifications
- International Mechanical Code
- International Building Code
- NFPA 90A and 90B
- UL 181; Class 1

In Canada:

- CAN/ULC S102-M88
- CAN/CGSB 51-GP-52M (facing)
- CAN/CGSB 51.10-92

Product Features

- UL GREENGUARD Air Quality Certified®
- UL GREENGUARD Gold CertifiedSM and UL Environment verified to be formaldehyde free
- Does not contain polybrominated diphenyl ethers (PBDE) such as: Penta – BDE, Octa – BDE or Deca – BDE
- California Title 24
- Tested and certified to meet all requirements of EUCEB

Technical Data

Surface Burning Characteristics

- Does not exceed 25 Flame Spread, 50 Smoke Developed when tested in accordance with ASTM E 84, CAN/ULC S102-M88, NFPA 255 and UL 723

Flexural Rigidity

- Available in two stiffness values: EI-475 and EI-800
- Flexural rigidity (EI) is the product of Young's modulus of elasticity (E) and moment of inertia (I) as determined in accordance with NAIMA AHS-100-74.

Service Temperature (ASTM C 411)

- Up to 250°F (121°C)

Air Velocity (UL 181)

- Maximum 5000 fpm (1524 mpm)
- Tested to 12,500 fpm (3810 mpm)

Corrosiveness (ASTM C 665)

- Does not accelerate corrosion on steel, copper or aluminum

Corrosion (ASTM C 1617)

- The corrosion rate in mils/yr will not exceed that of the 1 ppm chloride solution.

Internal Static Pressure (UL 181)

- Maximum $\pm 2"$ water (498 pascals [Pa])

Water Vapor Transmission Rate (ASTM E 96)

- Less than 0.02 perms

Water Vapor Sorption (ASTM C 1104)

- Less than 5% by weight

Microbial Growth (ASTM G 21, UL 181)

- Does not promote or support the growth of mold, fungi or bacteria

Application and Specification Guidelines

Storage

- Protect stored duct board from water damage, construction damage and other abuse.
- If stored outside, proper protection from weather conditions should be provided.

Application

- Duct shall be fabricated and installed in strict accordance with NAIMA's "Fibrous Glass Duct Construction Standard," "Residential Standard," "1½" Fabrication Manual" or Knauf Insulation "Air Duct Fabrication Manual" in accordance with the conditions of UL 181 listing. Duct systems shall have all transverse joints, longitudinal seams and duct wall penetrations sealed using 3" (76 mm) wide glass fabric and mastic, 2" (51 mm) minimum width heat sealable tape or 2" (51 mm) minimum width pressure sensitive tape with acrylic adhesive. Rubber-based adhesives are not approved.
- Only UL 181-A listed and labeled products shall be used for closure systems. A listing of specific approved closure products is available from your local Knauf Insulation sales representative.
PRESSURE SENSITIVE TAPES: Only those tapes listed under and imprinted with designation UL 181-A-P and registered with UL.
HEAT SEALABLE TAPES: Only those tapes listed under and imprinted with the designation UL 181 A-H and registered with UL.
MASTICS: Mastic systems listed and registered with UL and carrying the designation UL 181 A-M used in conjunction with a 3" (76 mm) wide glass fabric.

Procedures

1. PRESSURE SENSITIVE TAPE:

- a. All longitudinal and circumferential joints must be stapled with outward flaring, ½" (13 mm) minimum length staples 2" (51 mm) on centers.
- b. If necessary, follow the recommendations of the tape manufacturer for cleaning the surface to be taped.
- c. Center tape over staple flap and rub tape firmly in place immediately after application, using a plastic "squeegee" or similar tool, until the scrim reinforcement of the duct board facing can be clearly seen through the tape.
- d. A heat-sealing iron must be used to warm the surface of the board before applying the tape to assure a good bond when installed below 50°F (10°C).
- e. Tape should not be applied to surface of duct board when temperature is below 32°F (0°C) due to the possibility of entrapping ice crystals which, upon melting, will cause tape to loosen. Heat duct board facing surface first to drive off moisture.

2. HEAT SEALABLE TAPE:

- a. All longitudinal and circumferential joints must be stapled with outward flaring, ½" (13 mm) minimum length staples 2" (51 mm) on centers.
- b. If necessary, follow the recommendations of the tape manufacturer for cleaning the surface to be taped.
- c. Center tape over staple flap and seal down tape end with 500°F (260°C) iron. Do not use heat gun; both heat and pressure are required to effect a seal.
- d. Press down entire length of tape with iron using a smearing action to get a good bond. Be sure edges are sealed.



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- e. Tape should not be applied to surface of duct board when temperature is below 32°F (0°C) due to the possibility of entrapping ice crystals which, upon melting, will cause tape to loosen. Heat duct board facing surface first to drive off moisture.
- f. Allow joint to cool before stressing.

3. MASTIC AND GLASS FABRIC:

- a. All longitudinal and circumferential joints must be stapled with outward flaring, 1/2" (13 mm) minimum length staples 2" (51 mm) on centers.
- b. Brush approved mastic onto joint and embed 3" (76 mm) wide glass fabric in mastic.
- c. Brush second coat of mastic over glass fabric until mesh is completely filled.
- d. Follow mastic manufacturer's instructions on curing the mastic prior to subjecting the joint to stress.

Reinforcements

Duct sections shall be additionally reinforced where necessary, according to Knauf Insulation and NAIMA standards. Ductwork shall be supported as required on straight runs, at all turns and at transitions to maintain proper alignment. Hangers and supports shall be in strict accordance with Knauf Insulation and NAIMA standards.

Glass Mineral Wool and Mold

Glass mineral wool insulation will not sustain mold growth. However, mold can grow on almost any material when it becomes wet and contaminated. Carefully inspect any insulation that has been exposed to water. If it shows any sign of mold it must be discarded. If the material is wet but shows no evidence of mold, it should be dried rapidly and thoroughly. If it shows signs of facing degradation from wetting, it should be replaced. Air handling insulation used in the air stream must be discarded if exposed to water.

other details, refer to the latest edition of the NAIMA "Fibrous Glass Duct Construction Standard," "Residential Standard," "1 1/2" Fabrication Manual" or Knauf Insulation "Air Duct Fabrication Manual." Application and installation procedure is at the discretion of and is the responsibility of the Design Engineer to meet specific job requirements.

The chemical and physical properties of Knauf Insulation Atmosphere™ Air Duct Board with ECOSE® Technology represent typical average values determined in accordance with accepted test methods. The data is subject to normal manufacturing and testing variations. The data is supplied as a technical service and is subject to change without notice. References to numerical flame spread ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions.

Check with your Knauf Insulation sales representative to assure information is current. standards.

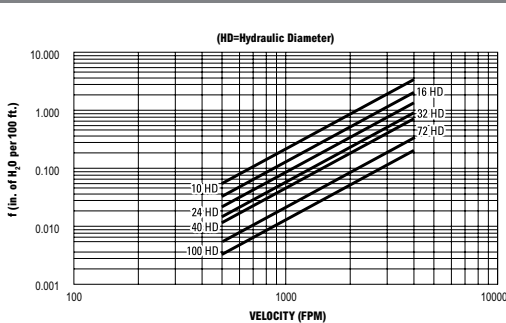
Closure

If the closure system used is not one of the approved systems described above and if application is not in accordance with stated procedures, Knauf Insulation assumes no liability for duct system performance. Use of a non-UL registered and listed closure voids the UL 181 Class 1 rating as well as Knauf Insulation's product performance warranties.

Notes

When used in accordance with NAIMA's and Knauf Insulation's application instructions, the closure systems described herein meet UL 181 requirements, and the resulting system carries a Class 1 Air Duct rating. This data sheet is not intended to be a design or fabrication manual. For specific details and recommendations on fabrication, reinforcement, hanging and

Friction Loss (Inches of water per 100')



FPM	Hydraulic Diameter						
	10"	16"	24"	32"	40"	72"	100"
500	.056	.031	.018	.013	.010	.005	.003
600	.080	.044	.026	.018	.014	.007	.004
700	.108	.059	.035	.025	.019	.009	.006
800	.140	.077	.046	.032	.024	.012	.008
900	.176	.096	.058	.040	.031	.015	.010
1000	.216	.118	.071	.050	.038	.018	.012
2000	.845	.463	.278	.194	.147	.071	.048
3000	1.887	1.034	.620	.432	.328	.159	.106
4000	3.340	1.831	1.097	.765	.580	.281	.188
5000	5.206	2.854	1.710	1.193	.904	.438	.293

Recommended Maximum Duct Dimensions Without Reinforcement*

Internal Pressure inches of water	EI-475-1"			EI-800-1", 1-1/2", 2"		
	.5 (125)†	1.0 (249)†	2.0 (498)†	.5 (125)†	1.0 (249)†	2.0 (498)†
Positive	36" (914 mm)	24" (610 mm)	15" (381 mm)	36" (914 mm)	24" (610 mm)	18" (457 mm)
Negative	34" (864 mm)	24" (610 mm)	14" (356 mm)	36" (914 mm)	24" (610 mm)	18" (457 mm)

* The above table summarizes span/pressure limitations for unreinforced duct. For larger ducts, refer to NAIMA's "Fibrous Glass Duct Construction Standard" or Knauf Insulation's "Air Duct Fabrication Manual".

†(Pressure—Pascals [Pa])

Sound Absorption Coefficients (ASTM 423, Type A Mounting)

		Octave Band Center Frequency (Cycles/Sec.)						
Type		125	250	500	1000	2000	4000	NRC
EI-475	1" (25 mm)	.03	.25	.62	.92	1.03	.97	.70
EI-800	1.5" (38 mm)	.02	.44	.96	1.17	1.16	1.12	.95
EI-800	2" (51 mm)	.19	.64	1.08	1.13	1.06	1.06	1.00

Thermal Conductivity k

(ASTM C177) Mean Temperature 75°F (24°C)

k-Value	
EI-475 and EI-800	.23 (.033)
"k" Units:	$\frac{\text{BTU} \cdot \text{in}}{\text{ft}^2 \cdot \text{hr} \cdot ^\circ\text{F}}$ $\left(\frac{\text{W}}{\text{m} \cdot ^\circ\text{C}} \right)$

Forms Available

Thickness	Size*	Edge	Pieces/Carton**
1" (25 mm)	48" x 96" (1219 mm x 2438 mm)	Shiplap	8
1" (25 mm)	48" x 120" (1219 mm x 3048 mm)	Butt, Shiplap	6
1.5**** (38 mm)	48" x 120" (1219 mm x 3048 mm)	Shiplap	4
2**** (51 mm)	48" x 120" (1219 mm x 3048 mm)	Butt, Shiplap	3

* Other lengths available on made-to-order basis. ** Palletized packaging available on request. *** EI-800 only.

Thermal Resistance R

(ASTM C518) Mean Temperature 75°F (24°C)

Thickness	R-Value (R.S.I.)
1" (25 mm)	4.3 (.76)
1.5" (38 mm)	6.5 (1.14)
2" (51 mm)	8.7 (1.53)
"R" Units:	$\frac{\text{ft}^2 \cdot \text{hr} \cdot ^\circ\text{F}}{\text{BTU}}$ $\left(\frac{\text{m}^2 \cdot ^\circ\text{C}}{\text{W}} \right)$